

Storm warnings were displayed on parts of the Texas coast and small-craft warnings for the other portions on the 1st, 8th, 11th, and 19th, and small-craft warnings on the 4th, 7th, 10th, 25th, and 31st. Winds occurred which justified the warnings. No general storm occurred without warnings.

"Norther" warnings were issued for United States shipping interests at Tampico, Mexico, on the 1st and 21st.—*I. M. Cline.*

DENVER FORECAST DISTRICT

Viewing the month as a whole, there were marked contrasts in weather conditions over the district. In Montana and northern Wyoming very mild and dry weather prevailed, with mean temperatures from 3° to 8° above normal; in Utah and Colorado, on the other hand, cold and stormy weather predominated, especially in northeastern Colorado, where it was the coldest March since 1909, and where more than double the normal amount of precipitation occurred. In New Mexico and Arizona more settled conditions prevailed, with temperature and precipitation both somewhat below normal. Many lows passed eastward along the Canadian border and a number of active disturbances crossed the central portion of the district. On the evening of the 18th, a low in the southwest and a high on the northeastern Rocky Mountain slope both having increased in intensity, with a sharp fall in temperature over Wyoming and northern Colorado, warning of a moderate cold wave was issued for southern Colorado and repeated for southwestern Colorado on the morning of the 19th. These warnings were fully verified over the regions specified, and the cold wave extended southward over New Mexico. On the evening of the 31st, with a low moving rapidly eastward over Kansas, followed by a sharp temperature fall in southeastern Wyoming and with mild temperature in eastern Colorado, a moderate cold-wave warning was issued for eastern Colorado. This warning was verified in the extreme eastern part of the State. Warnings to the air-mail service of fresh to strong westerly winds were issued for Wyoming on the evening of the 6th, and for Wyoming and northeastern Colorado the evening of the 14th. Frost warnings were issued for southern New Mexico on the 29th and 31st; temperatures low enough for the formation of frost occurred in the latter instance.—*E. B. Gittings.*

SAN FRANCISCO FORECAST DISTRICT

Unlike February, when the area of high barometer normally found central off the California coast was feeble or wholly absent and cyclones moved onto the coast in low latitudes, the month of March passed with this area of high barometric pressure fully organized and persistent, and consequently the types of cyclones and anticyclones experienced over the far Western States were radically different from those of the preceding month. As is usual when the anticyclone off the California coast is fully organized, the rainfall over California is deficient, and March proved no exception to this rule. Another striking feature of the pressure distribution over the western North American Continent and the northeast Pacific Ocean was the persistent high barometric pressure with cold weather, the coldest of the winter, over the Bering Sea and the equal persistence of low barometric pressure over the Gulf of Alaska, whence cyclones on many days passed eastward or southeastward onto the continent, and thus frequently caused the formation of

secondary cyclones over the intermountain region. As a result of the influences of these more or less persistent types of pressure distribution, the month passed without excessive rains in any part of the district, but with frequent occasions demanding the issue of warnings of frosts and freezing temperatures, except on the immediate coast. Storm warnings were rarely required and then only for the Washington and Oregon coasts and the inland waters of Washington.

After the 27th, the area of high barometric pressure off the California coast disappeared, and this disappearance was followed by general rains over California during the closing days of the month.

In addition to the general forecasts and warnings and the special forecasts for orchard heating, the district center issued regularly during the month flying-weather forecasts for the commercial airways of the district.—*E. H. Bowie.*

RIVERS AND FLOODS

By H. C. FRANKENFIELD

As the great flood in the Mississippi River and many of its tributaries continued at the end of the month, report thereon will be postponed until the end of the flood in the extreme lower river, which will probably be about the end of May.

Atlantic drainage.—Melting snows from high temperatures accompanied by moderate rains resulted in ordinary flood stages in the Connecticut River and in the Susquehanna River and tributaries in the State of New York about the middle of the month. The usual warnings were issued and the damages were small, virtually none in New England and about \$5,000 in New York. Savings in New York through the warnings were about \$10,000. There were also moderate floods in the rivers of the Carolinas between March 8 and 15 for which the usual warnings were issued. The damage was nominal.

East Gulf drainage.—There was a flood of substantial proportions in the Tombigbee River of Alabama and Mississippi, and in the Black Warrior River of Alabama, following the heavy rains of March 7, 8, and 13. Warnings were issued on March 9 and supplemented on March 13 and 14. At Demopolis, Ala., the crest in the Tombigbee River was 51.8 feet, 12.8 feet above the flood stage, on March 20, and the river was above the flood stage from March 10 to 29, inclusive. As movable property had been taken away preceding the high floods of January and February, the losses were very small, only about \$4,900, while the reported value of property saved through the warnings was \$24,925.

The rivers of the Pascagoula system were also in moderate flood about the middle of March. Warnings were issued and there was no damage of consequence. Pearl River, of Mississippi and Louisiana, was also in flood much of the month, especially at Jackson, Miss., but again there was no loss except as occasioned by suspension of business.

Great Lakes drainage.—Rains from March 18 to 21 caused moderate floods in the rivers of the Lake Erie drainage, but there was only some slight damage from overflow and seepage. Warnings were issued at the proper time.

Mississippi drainage—Ohio Basin.—The quite heavy rains during the third week of March resulted in floods throughout the Ohio River below Louisville, Ky., and in all its tributaries. They were not severe except in the Wabash system, in the Green River of Kentucky, and